

REMARKS

Initially, Applicant would like to express his appreciation to the Examiner for the detailed Official Action provided on June 21, 2004.

Upon entry of the above amendment, claims 1, 3, and 5 will have been amended, claims 2, 4, and 6 –26 will have been cancelled, further, new claims 27-45 will have been added. Thus, claims 1, 3, 5, 27-45 are currently pending. Applicant respectfully requests reconsideration of outstanding rejections, and allowance of all the claims pending in the present application.

Re: Amendments

The currently amended Claim 1 combines the original Claim 1 and Claim 2, and further includes the limitation of “the virtual picture parameter, generated by a parameter generator, comprises a first zero-valued motion vector and a first zero-valued coded-block pattern.” The limitation can be supported by:

- (1) Fig. 1(a), which illustrates an apparatus of the present invention for reordering a decode order into a display order, including a parameter generator 100 for generating a parameter 105;

- (2) The first paragraph of Detailed Description of Present Invention (on page 6), which states that “the present invention discloses an apparatus for reordering a decode order into a display order, comprises a parameter generator 100 for generating a parameter 105; a motion compensator 110, in response to the parameter 105, for outputting a virtual picture 115 using the first decode picture stored in the first buffer 131”; and
- (3) The fourth paragraph of Detailed Description of Present Invention (on pages 7 and 8), which states that “the corresponding parameter 105 comprising (in MPEG2 format): ... d. motion vector is user-defined, preferably 0; e. coded-block pattern is 0;”

The currently amended Claim 3 combines the original Claim 3 and Claim 4, and also the currently amended claim 5 combines the original claims 5 and 6. Further, these amended claims 3 and 5 respectively include the limitation of “the parameter, generated by the parameter generator, comprises a second zero-valued motion vector and a second zero-valued coded-block pattern.” The limitation is supported by the same support as the limitation of Claim 1.

Claims 2, 4 and 6-26 are cancelled.

Claims 27-45 are newly added and are supported by the fourth paragraph of Detailed Description of Present Invention (on pages 7 and 8):

“It is noted that pictures in the compressed picture sequence are either frame or field type,

virtual pictures are also frame or field type, the corresponding parameter 105 comprising
(in MPEG2 format):

- a. the picture coding type (picture_coding_type) of virtual picture is P-picture, every macro-block in a virtual picture is a skipped macro-block;
- b. the prediction of the macro-blocks in a virtual frame picture should be made as if frame_motion_type is "Frame-based";
- c. the prediction of the macro-blocks in a virtual field picture should be made as if field_motion_type is "Field-based";
- d. motion vector is user-defined, preferably 0;
- e. coded-block pattern is 0;
- f. as to virtual field picture, the prediction should be made from the field of the same parity.

Preferably, the parameter 105 also comprises a scale factor, so the width and height of a virtual picture can be different from the original picture."

Claim 33 is newly added and can be supported by Summary of Invention. Claim 33 recites that "..., wherein the second buffer is the only buffer for displaying the image in the display order."

Accordingly, the amended and newly added claims do not introduce any new matter.

Re: Rejection Under 35 U.S.C. 103(a)

The Examiner rejects Claims 1-4 under 35 U.S.C. 103(a) as being unpatentable over IWAMURA of record (US. 5,534,928) in view of FUNG (US. 5,909,224), and rejects Claims 5 and 6 under 35 U.S.C. 103(a) as being unpatentable over IWAMURA and FUNG as applied to claims 1-4, and further in view of TAHARA of record (US. 5,473,380).

The preferred embodiment in accordance with the present invention illustrates that the parameter generator 100 is capable of generating a virtual picture parameter to the motion compensator 110. The virtual picture parameters are generated so as to control the motion compensator 110 to move data among the memory buffers. The virtual picture parameters generated by the parameter generator 100 are not obtained from decoding a real compressed picture sequence bit-stream. On the contrary, the parameter generator 100 can generate all necessary parameters in a virtual picture by itself. The motion compensator 110 receives these virtual picture parameters from parameter generator 100 and creates “virtual” pictures which can transfer data from one memory buffer to another memory buffer. A virtual picture is similar to an ordinary P-picture except that it is created instead of being decoded from the real compressed picture sequence bit-stream. The twelfth paragraph of Detailed Description of Present

Invention (on pages 10 and 11), states: “upon receiving picture P6, decode picture P6 and store the decoded picture P6 into first buffer 131. In response to the parameter 105, generate a virtual picture using P3 stored in the third buffer 133, send the virtual picture to the second buffer 132. Subsequently, decode the received B4 and B5, send the decoded B4 and B5 directly to the second buffer 132, the display controller 140 will use the pictures stored in the second buffer 132 for display. The next picture received is I9, decode I9 and store the decoded I9 in the third buffer 133, also in response to the parameter 105, generate a virtual picture using P6 stored in the third buffer 131, send the virtual picture to the second buffer 132. The following B7 and B8 will be decoded, and the decoded B7 and B8 will be sent to the second buffer 132 directly, the display controller 140 uses the pictures stored in the second buffer 132 for display thereafter”, and the paragraph describing Table 2 (on page 12) states, “While in Table. 2, the motion compensator 110 is treated as a special DMA channel by moving data directly between different buffers to create virtual picture.” The paragraph specifies that the preferred embodiment of the present invention not only decodes pictures encoded in compressed picture sequence bit-stream in accordance with a decode order, but also generates virtual pictures which are not contained in the compressed picture sequence in order to transfer a decoded picture from one memory buffer to another memory buffer for displaying in the a display order. For example, I0_vp, P3_vp,

P6_vp shown in Fig.4 and table 2 are virtual pictures.

IWAMURA discloses an apparatus and method for decoding a plurality of video signals and determining errors in encoded video signals to be either correctable or uncorrectable (Abstract).

IWAMURA does not disclose, and one cannot be taught by IWAMURA, that virtual pictures which are not contained in a compressed picture sequence are generated in order to transfer a decoded picture from one memory buffer to another memory buffer for display (IWAMURA needs a switch to changeover to selectively output the data in one of the three buffers).

IWAMURA also does not disclose, and one cannot be taught by IWAMURA, that the apparatus has a parameter generator for generating virtual picture parameters and that the virtual picture parameter of each macroblock in a virtual picture includes a zero-valued motion vector and a zero-valued coded block pattern defined in the MPEG standard. Furthermore, the *B1 and B2 of Figure 3E are true pictures encoded in a compressed picture sequence, but not virtual pictures as the Examiner states. The concepts of the virtual pictures and the parameter generator of the present invention are not taught by IWAMURA.

Moreover, the characteristic that the virtual picture parameter of each macroblock in a virtual picture includes zero-valued motion vector and zero-valued coded block pattern defined in the MPEG standard also are not taught by IWAMURA.

FUNG discloses an apparatus and method for managing a frame buffer for MPEG video decoding. Fig. 2 of FUNG shows the use of a dedicated display buffer 26 that accepts I, P and B frames from frame buffers 24. Display buffer 26 is the only buffer for displaying images in a display order. However, FUNG does not disclose the method for moving pictures into the display buffer 26 by generating virtual pictures by a parameter generator. In the “Background of Invention” of the present application, it is stated that: “But under some circumstances, it is necessary to display pictures stored in one of the decoding buffer continuously, therefore the above-mentioned reordering method is not applicable..... [page 3] Another conventional technique provides additional DMA hardware with scaling function to move the pictures stored in decoded buffer to display buffer, but it requires additional hardware cost. Still another conventional technique uses system RISC to read pictures stored in the decoded buffer and write them into display buffer, the price is to cost excessive RISC I/O cycles and bring down RISC performance [page 5]”. FUNG does not specify how it moves a picture into the display buffer 26, but it is readily apparent that FUNG does not disclose the use of virtual pictures. Therefore, the concepts of the virtual pictures and the parameter generator of the present invention also are neither taught nor suggested by FUNG.

Based on the above reasons, Applicant respectfully traverses the rejection of claim 1. As presently amended, claim 1 includes, inter alia, "wherein the virtual picture parameter, generated by a parameter generator, comprises a first zero-valued motion vector and a first zero-valued coded-block pattern." Applicant asserts that IWAMURA and FUNG both fail to disclose at least the above feature. Additionally, there is nothing in any of the applied prior art suggest the combination of the teachings proposed by the Examiner in the above rejection. Moreover, even assuming, arguendo, that the combination of the teachings of IWAMURA and FUNG is proper, such combination would not result in Applicant's claimed invention as presently recited in claim 1. Accordingly, the Examiner is respectfully requested to withdraw the rejection of claim 1 and provided an early indication of the allowance thereof.

Applicant also submits that dependent claims 3, 5, and 27-45, which are at least patentable due to their respective dependencies from claim 1, either directly or indirectly, for the reasons noted above, recite additional features of the invention and are also separately patentable over the prior art of record.

Summary and Conclusion

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. The Applicant therefore respectfully requests that the

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Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and completed response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

Should the Examiner have any questions concerning this response, or the present application, the Examiner is respectfully requested to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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